DETAILED ACTION

A Brief Summary

In responding to Examiner's final rejection (4/18/2008) of the instant Application, Applicant presented (5/29/2008) after-final remarks/arguments with no further amendments to previously presented claims. Therefore, the claims remain the same as when the final rejection was made.

In view of the Applicant's arguments, the Examiner concludes that some parts of the arguments are persuasive. Therefore, previous final rejection is withdrawn and prosecution of the Application is reopened.

Reconsideration of the instant Application is given with a new ground rejection to claims 4-6. Previous rejections of claims 1-2 and 5-10 remain the same as before, for which Examiner presented a response to relevant parts of Applicant's after-final arguments. Claims 3 and 11-14 contain allowable subject matter and they remain to be objected, the same as previous final rejection indicated.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freiberg et al (US 6,788,657, Freiberg hereinafter) in view of Higuchi et al (US 2002/0012383, Higuchi hereinafter).

The present application is drawn to an "Adaptive Rate Matching Method".

Freiberg discloses a "universal mobile telephone system [UMTS] network with improved rate matching method" (col. 1 lines 1-3) comprising the following features:

- **Regarding Independent Claims 1, 8 and 9**

Claim 1, *in a transmission system* (fig. 1, which "is a schematic view of a UMTS network" recited col. 1 line 66) *for transmitting simultaneously at a global transmission*

power, corresponding to a global quality factor on reception, a set of various multiplexed services (refer to fig. 1 and see "in a UMTS network in which a plurality of services of a single user having different transmission power requirements are multiplexed in one channel and the technique of rate matching is applied" recited col. 1 lines 46-49, noting that such "multiplexed in one channel" will necessarily result in *transmitting simultaneously at a global transmission power, corresponding to a global quality factor on reception*) *having specific predetermined error rate requirements* (see "required to achieve a desired Bit Error Rate" recited col. 1 lines 53-54) *matching individual quality factors* (see "deriving for each service the Energy per Bit per Noise density E_B/N_o required to achieve a desired Bit Error Rate" recited col. 1 lines 52-54, noting that "$(E_B/N_o)_i$ indicates a QoS of service i" recited col. 8 line 21) *achievable with adequately adjusted current individual transmission powers* (see "desired transmission quality requirements of each transport channel is fulfilled and not significantly exceeded. This means that required transmission power to meet quality requirement for all transport channels is as low as possible" recited col. 2 lines 63-67), *a method of resource optimization* (see "a method of calculating the number of bits to be punctured or repeated to achieve effective rate matching" recited col.1 15-17) *comprising a step of balancing said current individual transmission powers with respect to, for a given service* (see "Semi-static Rate Matching: this is used to balance the transmission power requirements of different services, which are multiplexed to one Common Composite Traffic Channel (CCTrCH)" recited col. 3 lines 11-14), a desired bit *error rate* (see "to achieve the desired Bit Error Rate BER" recited col. 3 lines 34-35).

Claim 8, *a transmission system* (fig. 1, "a schematic view of a UMTS network" recited col. 1 line 66) *comprising an emitting entity* (fig. 1 "UE 12" and "UE 14" or "mobile users 12, 14" recited col. 2 line 14) *and a receiving entity* (fig. 1 "Node B 16" or "base station BTS/Node B 16" recited col. 2 lines 14-15) *for transmitting simultaneously at a global transmission power a set of various multiplexed services* (refer to fig. 1 and see "in a UMTS network in which a plurality of services of a single user having different transmission power requirements are <u>multiplexed in one channel</u> and the technique of rate matching is applied" recited col. 1 lines 46-49, noting that such "multiplexed in one channel" will necessarily result in *transmitting simultaneously at a global transmission power*) *having specific predetermined error rate requirements* (see "required to achieve a <u>desired Bit Error Rate</u>" recited col. 1 lines 53-54) *matching quality factors* (see "deriving for <u>each service</u> the <u>Energy per Bit per Noise density</u> E_B/N_o required to achieve a desired Bit Error Rate" recited col. 1 lines 52-54, noting that "$(E_B/N_o)_i$ indicates a QoS of service i" recited col. 8 line 21) *achievable with adequately adjusted current individual transmission powers* (see "desired transmission quality requirements of each transport channel is fulfilled and not significantly exceeded. This means that <u>required transmission power</u> to meet quality requirement for <u>all transport channels</u> is <u>as low as possible</u>" recited col. 2 lines 63-67), *the transmission system comprising resource optimization means* (fig. 2 "Rate Matching 45/55" means) *including means of balancing said current individual transmission powers with respect to, for a given service* (see "Semi-static Rate Matching: this is used to <u>balance the transmission power requirements of different services</u>, which are multiplexed to one Common Composite

Traffic Channel (CCTrCH)" recited col. 3 lines 11-14), a desired bit *error rate* (see "to achieve the desired Bit Error Rate BER" recited col. 3 lines 34-35).

Claim 9, *in a transmission system* (fig. 1, "a schematic view of a UMTS network" recited col. 1 line 66) *comprising an emitting entity* (fig. 1 "Node B 16" or "base station BTS/Node B 16" recited col. 2 lines 14-15) *and a receiving entity* (fig. 1 "UE 12" and "UE 14" or "mobile users 12, 14" recited col. 2 line 14, noting that Freiberg discloses "This entire procedure exists also in the downlink direction, ie from the BTS 16 to mobile 12 or 14" recited col. 2 lines 47-48) *for transmitting simultaneously at a global transmission power a set of various multiplexed services* (refer to fig. 1 and see "in a UMTS network in which a plurality of services of a single user having different transmission power requirements are <u>multiplexed in one channel</u> and the technique of rate matching is applied" recited col. 1 lines 46-49, noting that such "multiplexed in one channel" will necessarily result in *transmitting simultaneously at a global transmission power*) *having specific predetermined error rate requirements* (see "required to achieve a <u>desired Bit Error Rate</u>" recited col. 1 lines 53-54) *matching quality factors* (see "deriving for <u>each service</u> the <u>Energy per Bit per Noise density</u> E_B/N_o required to achieve a desired Bit Error Rate" recited col. 1 lines 52-54, noting that "$(E_B/N_o)_i$ indicates a QoS of service i" recited col. 8 line 21) *achievable with adequately adjusted current individual transmission powers* (see "desired transmission quality requirements of each transport channel is fulfilled and not significantly exceeded. This means that <u>required transmission power</u> to meet quality requirement for <u>all transport channels</u> is <u>as low as possible</u>" recited col. 2 lines 63-67), *the receiving entity* (fig. 1 mobile 12 or 14)

comprising resource optimization means (fig. 2 "Rate Matching 45/55" means) *including means of balancing said current individual transmission powers with respect to, for a given service* (see "Semi-static Rate Matching: this is used to <u>balance the transmission power requirements of different services</u>, which are multiplexed to one Common Composite Traffic Channel (CCTrCH)" recited col. 3 lines 11-14), a desired bit *error Rate* (see "to achieve the desired Bit Error Rate BER" recited col. 3 lines 34-35).

Freiberg does not expressly disclose the following feature (underlined part below) for all of above Independent claims 1, 8 and 9:

... balancing said current individual transmission powers with respect to an estimation, for a given service, <u>of a difference between said specified predetermined error rate requirement and a measured current error rate</u>. However, since Freiberg has already taught to perform the same *with respect to* <u>achieving the desired Bit Error Rate PER</u> as cited above, there would have been obvious and would have no difficulty for Freiberg to do the same as what is shown in Higuchi.

Higuchi discloses a "transmission power control method and mobile communication system" (p1 left col. lines 1-2) comprising, <u>regarding claims 1, 8 and 9:</u>

balancing said current individual transmission powers with respect to an estimation, for a given service, <u>of a difference between said specified predetermined error rate requirement and a measured current error rate</u> (see "varying ... the amount of correction of the <u>target reception power value</u>, according to the <u>difference between</u> the <u>detected</u> reception <u>error rate</u> and the <u>target</u> reception <u>error rate</u>" recited p7 right col. claim 6 lines 3-8, and in tern "the <u>transmission power</u> can be controlled to a

predetermined target value based on [the SIR or] the target reception power value" recited Abstract lines 7-9).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Freiberg by adding the method of Higuchi of adjusting transmission power per error rate difference in order to provide a more stable system "in which transmission power control capable of realizing a constant reception quality (communication quality) can be performed regardless of the change in the propagation environment such as the change in the number of multipath, the mobile station velocity or the like" (Higuchi, [0016] lines 5-9).

- **Regarding Dependent Claims**

Freiberg discloses the following features:

Claim 2, *a method as claimed in claim 1, wherein the step of balancing the current individual power includes dynamically adapting rate matching parameters associated to the services, which are related to a number of bits to be repeated or punctured during transmission of said services* (see "... a method of determining for each service the number of bits to be punctured or repeated to provide rate matching" recited Abstract lines 3-5).

Claim 10, *a computer program product for a receiver computing a set of instructions, which when loaded into the receiver, causes the receiver to carry out the method as claimed in claim 1* (It is obvious to one skilled in the art that Freiberg's method will have to be performed with *a computer program product for a receiver computing a set of instructions, which when loaded into the receiver, causes the*

receiver to carry out the method, noting especially that in Freiberg's method "the mobiles can calculate from the received values and the values stored in the look up table the number of bits to be punctured or repeated" recited Abstract last three lines).

3. Claim 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freiberg in view of Setty et al (US 2003/0103469, Setty hereinafter) and further in view of Reefman et al (US 2002/0163455, Reffman hereinafter).

Regarding Claim 4, Freiberg discloses *in a transmission system* (fig. 1, which "is a schematic view of a UMTS network" recited col. 1 line 66) *for transmitting simultaneously at a global transmission power, a set of various multiplexed services* (refer to fig. 1 and see "in a UMTS network in which a plurality of services of a single user having different transmission power requirements are multiplexed in one channel and the technique of rate matching is applied" recited col. 1 lines 46-49, noting that such "multiplexed in one channel" will necessarily result in *transmitting simultaneously at a global transmission power*) *comprising a set of transport data blocks of various predetermined sizes for transporting block-coded data on specific transport channels* (see "An additional requirement is that the semi-static rate matched transport block must fit into a physical channel having bits per frame N_{Frame}. One time frame is 10 milliseconds and contains N_s symbol bits where $N_s = 16 \cdot \sum N_{dataj}$" recited col. 4 lines 43-50) *having specific predetermined error rate requirements* (see "required to achieve a desired Bit Error Rate" recited col. 1 lines 53-54) *associated to quality factors* (see "deriving for each service the Energy per Bit per Noise density E_B/N_o required to achieve a desired Bit Error Rate" recited col. 1 lines 52-54, noting that "$(E_B/N_o)_i$ indicates

a QoS of service i" recited col. 8 line 21), *which necessitate adequately adjusted current individual transmission powers* (see "desired transmission quality requirements of each transport channel is fulfilled and not significantly exceeded. This means that required transmission power to meet quality requirement for all transport channels is as low as possible" recited col. 2 lines 63-67), *a method of resource optimization* (see "a method of calculating the number of bits to be punctured or repeated to achieve effective rate matching" recited col.1 15-17) *including a step of balancing said current individual transmission powers* (see "Semi-static Rate Matching: this is used to balance the transmission power requirements of different services, which are multiplexed to one Common Composite Traffic Channel (CCTrCH)" recited col. 3 lines 11-14), *wherein the step of balancing said current individual transmission powers includes a step of* using *code block size coding gains related to the transport data blocks for deriving individual quality factors matching said specific predetermined error rate requirements* (see "After the channel coding step, which is specific to the service i and is described by the coding factor (coding gain) CF_i, when the number of coded bit $N_{codi}=N_{biti} \cdot CF_i$. This value is the input to a rate matching step, the output of which is $(E_S/N_o)_i$, the QoS after the coding and rate matching" recited col. 8 lines 22-26).

Freiberg does not disclose that said power balancing is performed *with respect to the predetermined sizes of said transport data blocks*.

Setty discloses a "method and apparatus for controlling the transmission power in radio communication system" (p1 left col. lines 1-3) wherein "rate matching is applied" ([0002] line 12) comprising:

balancing transmission power *with respect to the predetermined sizes of said transport data blocks* (see "adjusting the transmission power of the system according to a relationship between the size of a Midample signal and the size of a data signal with a transmission burst" recited [0011]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Freiberg by adding the aforesaid step of Setty to Freiberg in order to provide an expanded method and system "for controlling the T_x power during the rate matching in a TDD system" as pointed out by Setty ([0005] lines 1-3), which was needed because "there are no provisions for controlling the T_x power in a TDD wireless telecommunication system" as Setty said ([0004]) and further "by reducing the T_x power requirements during rate matching, the overall power requirements of the wireless telecommunication system and the system's costs are reduced" ([0005] lines 3-6).

Although Freiberg discloses using *code block size coding gains for deriving individual quality factors matching said specific predetermined error rate requirements*, neither Freiberg nor Setty expressly discloses, regarding claim 4, *estimating* code block size coding gain and use the estimated value for the above purpose.

Reefman disclose method and system for "Audio signal compression" (Title) that correlates signal power of bit stream signals with compression gain ([0014]). Reefman's disclosure comprises:

estimating code block size coding gains (refer to fig. 1 and see "a correlation as represented in fig. 1 between the signal power of the bit-stream signal in the DSD format

and the compression gain is used to provide a quick and accurate estimate of the coding gain. As shown the signal power may be extracted from the bit-stream signal by an extraction and correlation device 6 connected with the output from the signal processor 2 and supplying the compression ratio or coding gain estimate as an input control signal to the parameter control device", [0014] wherein emphases are added).

It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the system of Freiberg by adding the coding gain estimate feature of Reefman to Freiberg in order to provide a more robust system which "is especially advantageous in losslessly compressing" (Reefman, [0006]).

Regarding claim 5, Freiberg discloses *the step of balancing the current individual transmission powers includes a step of dynamically adapting at code block size change rate matching parameters associated to the services, which are related to a number of bits to be repeated or punctured during transmission of said services* (see "... a method of determining for each service the number of bits to be punctured or repeated to provide rate matching" recited Abstract lines 3-5).

Regarding claim 6, Freiberg discloses *wherein the step of dynamically adapting at code block size change rate matching parameters associated to the services includes a preliminary step of determining groups within the set of transport data blocks, a same group comprising transport data blocks associated to quality factors, which may differ only within a predefined rage* (refer to fig. 2 and see "the steps to encode services with identical QoS requirements are shown within box 30, and identical steps to encode a set of different services are performed within box 31" recited col. 2 lines 29-32), *and a*

step of computing the rate matching parameters with respect to a predetermined rule corresponding to the associated quality factor of the group (still refer to fig. 2, especially box 30, and see, as a follow-up step to the above cited step, "rate matching step 45" recited col. 2 lines 36-37, and "the equivalent rate matching step 55 is shown in box 31" recited col. 2 line 38, and further "the rate matching factor for each service is calculated by $RF_i = DRF \cdot SRF_i$" recited col. 6 lines 4-5, noting the subscript "i" suggests that the RF is different from one service to another).

Allowable Subject Matter

4. Claims 3 and 11-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 3 and 11-14 essentially recite the same set of unique steps for carrying out adaptive rate matching method for matching the specific predetermined error rate requirement of given quality of services. These claims appear to contain allowable subject matters. The closest prior art of Freiberg and Higuchi, as cited above in sections 2 and 3, provided conventional method of rate matching in a wireless communication system with transmission power adjustments or balancing for individual services to meet data error requirements. However, said closest prior arts, singularly or in combination, fail to teach the particular and unique steps claimed in claims 3 and 11-14 of present Application regarding transmission power balancing and rate matching.

Response to Arguments

5. Applicant's arguments filed on 5/29/2008 regarding claims 1, 8, 9 and 10 have been fully considered but they are not persuasive.

6. Applicant argues (page 8 third paragraph) in general terms, "the Office Action's comments may have paraphrased the language of the claims and it should be understood that the language of the claims themselves set out the scope of the claims. Thus it is noted that the claim language should be viewed in light of the exact language of the claim rather than any paraphrasing or implied limitations thereof".

Examiner respectfully disagrees. First of all, Applicant did not present exactly where Examiner "paraphrased" the claims. The only place that might be considered by the Applicant as "paraphrasing" is where Examiner stated "Let's first take a look at what the 'estimate' is. It is, as claimed, 'an estimate ... of a difference between the specific predetermined error rate requirement and a measured current error rate'. Mathematically, this is an estimate of $\Delta = E_{req} - E_{cur}$ wherein the requirement E_{req} is 'specific predetermined' as claimed and the current error rate E_{req} 'measured' also as claimed."

Assuming this is what the Applicant meant by "paraphrasing", Examiner would like to point out that the final rejection itself was not made based on the above statement. It should be understood that the above statement was only an effort for the Examiner to present his response to Applicant previous arguments. And most importantly, Examiner finds no distortion at all, even taken the cited statement above, of Applicant's claimed language. It is a common sense to anyone skilled in the art that a statement of "difference between A and B" is simply a mathematical expression of $\Delta = A - B$ or $\Delta = B - A$. This should be an indisputable common sense logic, which naturally

leads to what Examiner stated above when $A = E_{req}$ and $B = E_{cur}$. Therefore, the Examiner maintains that the final rejection was made wherein "the claim language" is viewed "in light of the exact language of the claim rather than any paraphrasing or implied limitations thereof".

7. Now regarding the "exact language of the claim" over the term of *estimate*. Applicant argues (page 9 second paragraph), after quoting the above cited texts from claim 1 (page 9 first paragraph), "Higuchi is concerned with controlling power based on the actual measured difference between a detected reception error rate and a target reception error rate, and not an estimate of the difference," and further "Higuchi appears to be silent regards to controlling power according to an estimate of the difference between a detected reception error rate and a target reception error rate because Higuchi merely describes using an actual measurement".

Examiner respectfully directs, again, the Applicant to the fact that we are talking about "... estimate ... of a difference between the specific predetermined error rate requirement and a measured current error rate" (emphasis added). Here we are talking about a difference that is being estimated, which is **simply a calculation** of the difference of the two terms as claimed, one being a preset requirement value and the other being measured current value. Applicant should not ignore the fact that a **measured error rate**, which requires measurement, being used in the particular "estimate" as claimed, which is, again, simply a calculation, and more importantly, the "exact language of the claim" requires such **measured error rate** be **current**, which requires the measurement being made at the "current" moment when the "estimate" or

calculation is performed. Examiner fails to see the difference between the "exact language of the claim" and Higuchi's teaching of "varying ... the amount of correction ... according to the difference between the detected reception error rate [reading on claimed *measured current error rat*] and the target reception error rate [reading on *specific predetermined error rate requirement*]".

Applicant also alleges (page 9 first paragraph) "The Office Action further asserts that an 'estimate' is generally equivalent to a 'measurement.' Office Action page 13". Examiner respectfully disagrees. Throughout page 13 of the final rejection, and in fact the whole Office Action, Examiner failed to see where such assertion was made. Here, it appears to the Examiner that the Applicant in fact "paraphrased" Examiner's statement. What Examiner asserted therein is estimates "will have to be based on certain prior knowledge from real data. Even a theoretical prediction will have to be tested and verified with experimental data". This merely says that "estimates" will have to be based on some type of measurements, but not at all "estimate is generally equivalent to a measurement" as Applicant paraphrased. Examiner's such statement is even suggested by the Applicant (specification page 12 lines 21-23) "during transmission, measure on receiving side actual BER/BLER performance on each TrCH and correspoing E_s/N_0 and derive a better estimate of TrCH current performance curve." (emphasis added).

Applicant further argues (page 10 first paragraph) "the mere description of a measurement is insufficient to teach an estimate". While agreeing with this statement in general terms, Examiner respectfully direct Applicant's attention to the particularity of

the "estimate" as claimed. It is simply, as cited above already, obtaining the difference between specific predetermined error rate requirement and a measured current error rate. The final rejection was given in view of this "exact language of the claim" regarding "estimate" rather than any estimates in general.

8. Applicant's arguments, see Remarks/Argument page 10 last paragraph (especially "Freiberg is silent with regard to whether the coding gain CF_i could be an estimate"), filed 5/29/2008, with respect to the rejection(s) of claim 4 under USC 35 1039(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground of rejection is made in view of Reefman, as discussed in section 3 above wherein Reefman is cited as disclosing "a correlation between the signal power of the bit-stream signal in the DSD format and the compression gain is used to provide a quick and accurate estimate of the coding gain" (Reefman, [0014]).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANDREW LAI whose telephone number is (571)272-9741. The examiner can normally be reached on M-F 7:30-5:00 EST, Off alternative Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Yao can be reached on 571-272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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